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# First record of *Epicadus trituberculatus* (Taczanowski, 1872) (Araneae, Thomisidae, Stephanopinae) in the Brazilian Northeast

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## Abstract

We present the first record of *Epicadus trituberculatus* (Taczanowski, 1872) from the Northeast Region of Brazil. The new record is based on six specimens observed in two areas of montane semi-deciduous tropical forest located in two municipalities: Guaramiranga and Pacatuba, Ceará state, Brazil. Of the six specimens observed we collected manually only three to preserve as voucher material. In Brazil, *E. trituberculatus* has a wide distribution range, which extends from the Atlantic Forest, Amazon, and Cerrado biomes and the Pampa ecoregion. With the new record there are currently six known species of *Epicadus* in northeastern Brazil.

## Keywords

Biodiversity, distribution map, Maciço de Baturité, spider, tropical forest.

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## Introduction

The family Thomisidae is the seventh largest family of spiders, currently comprising 170 genera and 2163 species (World Spider Catalog 2019). They present worldwide distribution with most of their species occurring in tropical or subtropical regions (Machado et al. 2018; World Spider Catalog 2019). These spiders are diurnal sit-and-wait predators that are often found in vegetation, mainly on flowers or leaves. Some species are cryptically colored and are able to change their coloration to camouflage themselves in their environment, such as *Epicadus heterogaster* (Guérin, 1829) (Silva-Moreira and Machado 2016; Vieira et al. 2017). The genus *Epicadus* Simon, 1895 belongs to the subfamily Stephanopinae Simon, 1895 and currently consists of 11 species occurring in the Neotropics from Mexico to Argentina (Silva-Moreira and Machado 2016; World Spider Catalog 2019). In Brazil, 10 of the 11 species currently described in *Epicadus* can be found (*E. tigrinus* Machado, Teixeira & Lise, 2018 was recorded only in Costa Rica and Panama). *Epicadus trituberculatus* (Taczanowski, 1872), specifically, has been recorded in the states of Amapá, Amazonas, Bahia, Espírito Santo, Goiás, Mato Grosso, Mato

Grosso do Sul, Minas Gerais, Pará, Paraná, Rio Grande do Sul, Rondônia, Roraima, São Paulo, and Santa Catarina (Machado et al. 2017, 2018). *Epicadus* species can be recognized by their globose opisthosoma with a set of conical projections and a median spire on the fovea region; for more details, see Silva-Moreira and Machado (2016) and Machado et al. (2018). *Epicadus* individuals reflect light in the ultraviolet (UV) wavelength range of the spectrum and manipulate the UV signals of flowers, which these spiders to attract and ambush pollinators (Vieira et al. 2017). Despite the wide geographical distribution of the genus, little is known about the biology of its component species. The objective of this work is to record the first known occurrence of *E. trituberculatus* in the state of Ceará and extend the geographic distribution of the genus *Epicadus* to the Northeast Region of Brazil.

## Methods

The study was conducted in two areas of montane semi-deciduous tropical forest in the municipalities of Guaramiranga (04°18′40″S, 038°58′05″W, 910 m a.s.l.) and Pacatuba (03°96′72″S, 038°58′19″W), both in the state of Ceará, Brazil (Fig. 1A). These two areas are quite peculiar for representing two remnants of Atlantic Forest within a semi-arid region (Oliveira and Araújo 2007). Both areas have a mean annual temperature of 20.8 °C and mean annual precipitation of 1221 mm (Araújo et al. 2007) (Fig. 1A).

The new record is based on six specimens observed in the forest reserves of Guaramiranga and Pacatuba in January 2019 (all adult females, Fig.1B). Of the six specimens observed we collected manually only three to preserve as voucher material. The identification of the individuals was made based on the identification key of Machado et al. (2018). Individuals were photographed on the field using the camera Canon 6D. All specimens collected were preserved in 70% alcohol and deposited in the Arachnida collection at the Instituto Butantan, São Paulo (IBSP, curator A.D. Brescovit).

## Results

**New records.** Brazil: Ceará • Guaramiranga (04°18′40″S, 038°58′05″W; 910 m a.s.l.), Sobczak JF leg, 15/I/ 2019, 3♀ (IBSP 237996, IBSP 237997, IBSP 237998). • Pacatuba (03°96′72″S, 038°58′19″W; 850 m a.s.l.), Sobczak JF leg, 13/VII/ 2019, 3♀(Fig. 2).

**Identification.** According to the diagnosis of Machado et al. (2018), females of *E. trituberculatus* have a somewhat similar morphology with *E. camelinus*. However, they can be distinguished by the coloration pattern, as *E. trituberculatus* presents the anterior tibiae and femora of the first and second pair of legs entirely yellow while *E. camelinus* has large brown stains on the first and second pair of legs. In addition, unlike *E. camelinus*, the females of *E. trituberculatus* have three equal-sized tips at the end of the median posterior opisthosomal projection and their copulatory openings are entirely covered by the posterior folds of the epigynal plate.

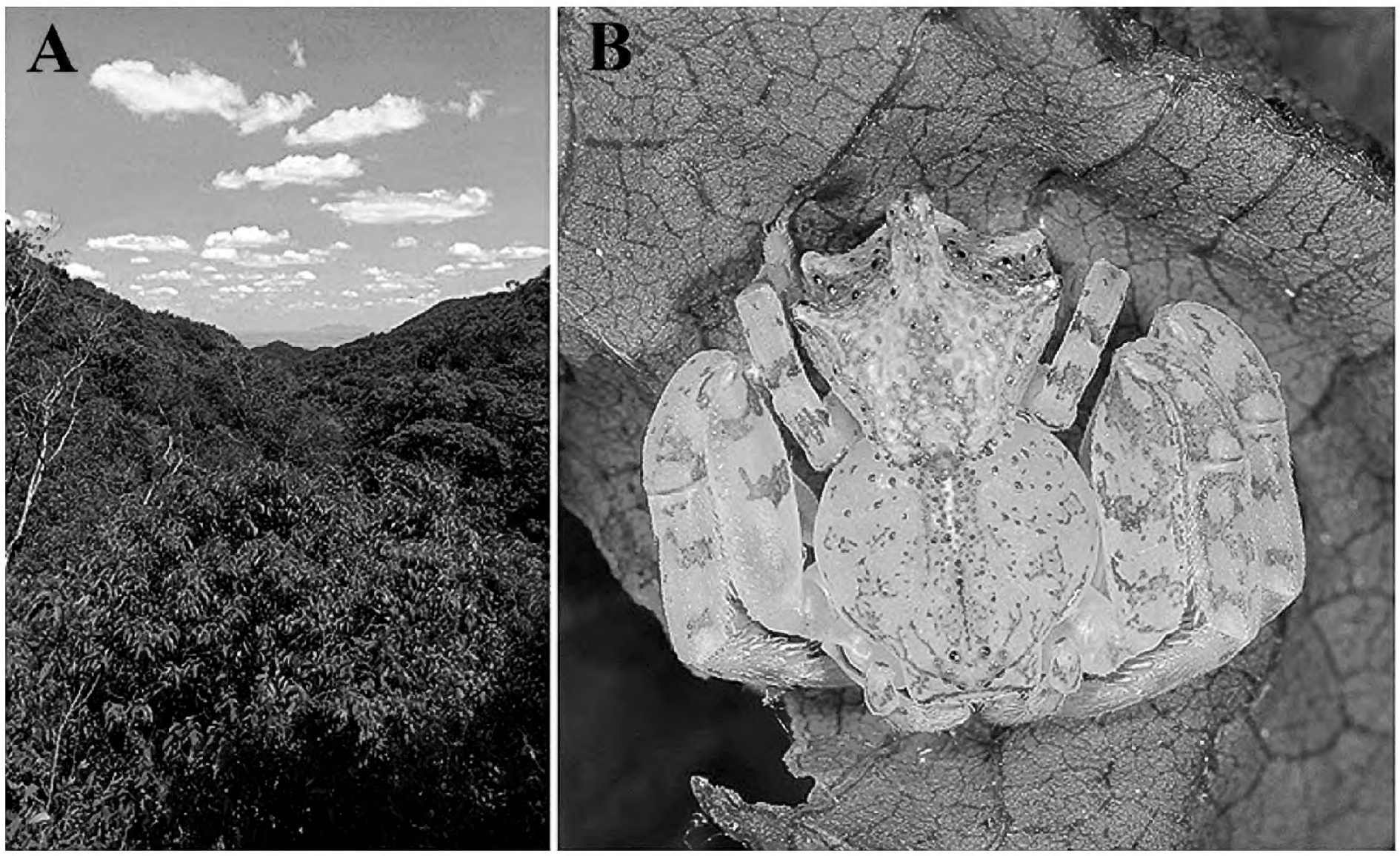


**Figure 1.** *Epicadus trituberculatus* (Taczanowski, 1872). **A.** Guaramiranga study site: montane semi-deciduous tropical forest. **B.** Dorsal view of an adult female of *E. trituberculatus* (Thomisidae) recorded in state of Ceará, Brazil.

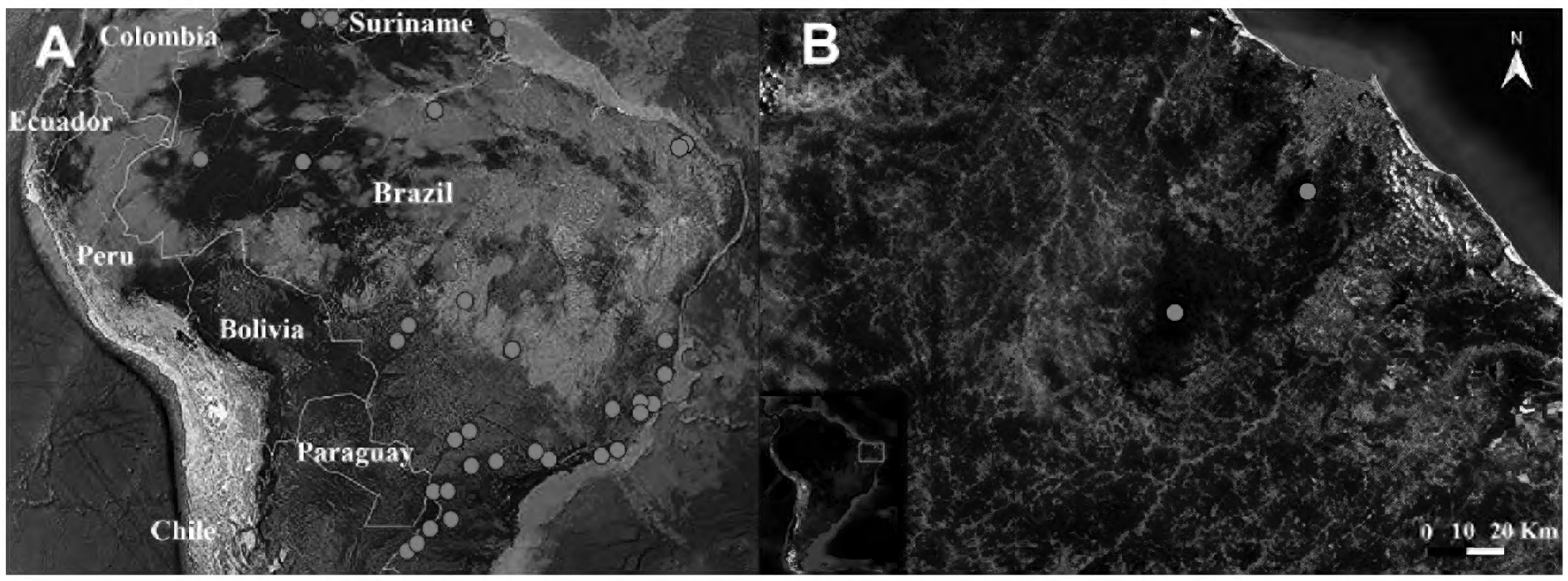


**Figure 2.** Data of distribution records of *Epicadus trituberculatus* (Taczanowski, 1872). **A.** Distribution map of *E. trituberculatus* in Brazil based on studies by Machado et al. (2017, 2018; yellow circles) and the new records (red circles). **B.** Details of the new records in the state of Ceará, Brazil.

## Discussion

*Epicadus trituberculatus* was originally described by Taczanowski (1872) as *Thomisus trituberculatus* in French Guiana (type locality), then recorded in Mexico, Panama, Peru, Bolivia, Brazil, and Argentina (Machado et al. 2018). In Brazil, this species was recorded in the South, Southeast, Midwest, and North regions. These regions match the Brazilian biomes: Atlantic Forest, Amazon, Cerrado, Pampa, and Pantanal (Machado et al. 2017, 2018). In the Atlantic Forest, this species was mainly observed in dense and mixed rainforest ecosystems characterized by constant rainfall throughout the year. In the new record, *E. trituberculatus* occurred in the montane seasonal semideciduous forest (part of the Atlantic Forest biome), an ecosystem characterized by dual climatic seasonality: a season with intense summer rains, followed by a drier and colder period. This wide range of geographic distribution suggests that *E. trituberculatus* has the capacity to colonize locations with different climatic conditions, possibly due to a tolerance to differing temperature and humidity of these different environments. However, future studies are needed to elucidate the possible physiological adaptations of spiders in response to different climatic conditions. In the Northeast Region of Brazil there are other species of *Epicadus*—*E. caudatus* (Mello-Leitão, 1929), *E. heterogaster* (Mello-Leitão, 1929), *E. pulcher* (Mello-Leitão, 1929), *E. rubripes* Mello-Leitão, 1924, and *E. taczanowskii* (Roewer, 1951)—but they have only been recorded for the state of Bahia (Machado et al. 2015; Silva-Moreira and Machado 2016). The new record presented here suggests that the ecosystems in northeastern Brazil are poorly studied and probably harbor more species of spiders that are unrecorded or undescribed.

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## Authors' Contributions

JFS, JCMSMS, ALS and MG collected, identified and photographed the specimen. GAVB wrote the manuscript. All authors discussed the results and contributed to the final version of the manuscript.

## References

Araújo FS, Gomes VS, Lima-Verde LW, Figueiredo MA, Bruno MMA, Nunes EP, Otutumi, AT, Ribeiro KA (2007) Efeito da variação topoclimática na composição e riqueza da flora fanerogâmica da serra de Baturité, Ceará. In: Oliveira TS, Araújo FS (Eds). Diversidade e conservação da biota da serra de Baturité, Ceará. Seri&A Gráfica, Fortaleza, Ceará, 137–162.

Dippenaar-Schoeman AS, Jocqué R (1997) African spiders: an identification manual. Biosystematics Division. ARC-Plant Protection Research Institute, Pretoria, 392 pp.

Machado M, Teixeira RA, Lise AA (2015) Taxonomic notes on the crab spider genus *Tobias* Simon, 1895 (Araneae, Thomisidae, Stephanopinae). Zootaxa 4034 (3): 565–576. https://doi:10.11646/zootaxa.4034.3.8

Machado M, Teixeira RA, Lise AA (2017) Cladistic analysis supports the monophyly of the Neotropical crab spider genus *Epicadus* and its senior synonymy over *Tobias* (Araneae: Thomisidae). Invertebrate Systematics 31 (4): 442–455. https://doi.org/10.1071/IS16074

Machado M, Teixeira RA, Lise AA (2018) There and back again: more on the taxonomy of the crab spiders genus *Epicadus* (Thomisidae: Stephanopinae). Zootaxa 4382 (3): 501–530. https://doi.org/10.11646/zootaxa.4382.3.4

Oliveira TSD, Araújo FS (2007) Diversidade e conservação da biota na Serra de Baturité, Ceará. Edições UFC, COELCE, Fortaleza, 465 pp.

Silva-Moreira TD, Machado M (2016) Taxonomic revision of the crab spider genus *Epicadus* Simon, 1895 (Arachnida: Araneae: Thomisidae) with notes on related genera of Stephanopinae Simon, 1895. Zootaxa, 4147 (3): 281–310. https://doi.org/10.11646/zootaxa.4147.3.4

Vieira C, Ramires EN, Vasconcellos-Neto J, Poppi RJ, Romero GQ (2017) Crab spider lures prey in flowerless neighborhoods. Scientific Reports 7 (1): 9188. https://doi.org/10.1038/s41598-017-09456-y

World Spider Catalog (2017) World spider catalog, version 20.0. Natural History Museum Bern, Bern. http://wsc.nmbe.ch. Accessed on: 2019-3-26.